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<p>Environmental Restoration Project Standard Operating Procedure</p> <p>for:</p> <h1>Screening of Polychlorinated Biphenyls in Soil</h1>				
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Screening of Polychlorinated Biphenyls in Soil

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Screening of Polychlorinated Biphenyls in Soil

NOTE: Subcontractors may follow this standard operating procedure (SOP) for screening polychlorinated biphenyls (PCBs) in soil, or may use their own procedure(s) as long as the substitute meets the requirements prescribed by the Laboratory's LPR 308-00-00.1, Quality, and has been approved by the Environmental Restoration (ER) Project's Quality Program Project Leader (QPPL) before the commencement of the designated activities.

NOTE: ER Project personnel may produce paper copies of this procedure printed from the controlled-document electronic file located at

http://erinternal.lanl.gov/home_links/Library_proc.shtml. However, it is their responsibility to ensure that they are trained to and utilizing the current version of this procedure. The author may be contacted if text is unclear.

1.0 PURPOSE

This SOP describes the process for using test kits to screen for PCBs in soil during activities at the Los Alamos National Laboratory (Laboratory) ER Project.

2.0 TRAINING

The **Field Team Leader** (FTL) is responsible for ensuring that field team members are familiar with the objectives of, and properly trained in, the procedures of screening for PCBs in soil. In addition, team members using field-screening kits must document that they have read and understand this procedure and the appropriate manufacturer's instructions, in accordance with QP-2.2, Personnel Orientation and Training.

3.0 DEFINITIONS

- 3.1 PCBs— Highly stable organic compounds that are prepared by the reaction of chlorine with biphenyl. A commercial mixture of such chlorinated isomers of biphenyl provides a colorless, viscous liquid that is relatively insoluble in water, does not degrade under high temperatures, and is a good dielectric. Because of these qualities, PCBs are particularly useful as lubricants, heat-transfer fluids, and fire-resistant dielectric fluids in transformers and capacitors. In addition, they are good plasticizers and have found application in paints, paper coatings, and certain packaging materials.
- 3.2 Site-Specific Health and Safety Plan (SSHASP)—A health and safety plan that is specific to a site or ER-related field activity and that has been approved by an ER health and safety representative. This document contains information specific to the project including scope of work, relevant

history, descriptions of hazards by activity associated with the project site(s), and techniques for exposure mitigation (e.g., personal protective equipment [PPE]) and hazard mitigation.

4.0 BACKGROUND AND PRECAUTIONS

NOTE: This SOP is to be used in conjunction with an approved SSHASP. Also, consult the SSHASP for information about, and use of, all PPE.

- 4.1 PCBs have been used extensively for over half a century. Their properties make them ideal for use as plasticizers, adhesives, and dielectric fluids in capacitors and transformers. PCBs are extremely lipophilic compounds. This characteristic permits rapid penetration of cell membranes and uptake by tissues. Joint consideration of cancer studies and environmental processes leads to a conclusion that environmental PCB mixtures are highly likely to pose a risk of cancer to humans (EPA, IRIS, <http://www.epa.gov/iris/subst/0294.htm>).
- 4.2 PCB field-screening kits should only be used to help guide an investigation, corrective action, etc.; they cannot be used to substantiate regulatory compliance. Data used to make no-further-action decisions or conduct risk assessments must be analyzed using EPA-approved methods.
- 4.3 PCB field-screening kits provide simple, economical, and quick (~1 hr) results in the field. The kits are generally PCB-specific; however, Pentachlorophenol, 2,2',5,5'-Tetrabromobiphenyl, Tetradifon, Holowax, and other chlorinated compounds may cause interference. These kits are most effective when PCBs are the only contaminant present in the field sample.
- 4.4 Hazards associated with using a PCB field-screening kit include the possibility of field team members being exposed to the chemicals and/or PCB-contaminated media used for the analysis. These compounds are typically contained in glass ampules. Precautions should be taken when opening the ampules; these hazards (and their mitigation methods) should be included in the SSHASP.
- 4.5 The chemicals that are part of the kit, as well as the process of the analysis, must be considered when preparing the waste characterization strategy form for the work being done: some of the chemicals may be classified as hazardous. In addition, consideration should be given to how the chemicals are stored, handled, and disposed of, to ensure compliance with appropriate procedures for waste management (ER-SOP-1.06, Management of ER Project Wastes).

5.0 EQUIPMENT

- 5.1 PCB screening kit (this may include balance, differential photometer, etc.). A complete list of the components should appear in the manufacturer's instruction manual.
- 5.2 PPE (as described in the SSHASP)

6.0 PROCEDURE

Note: Deviations from SOPs are made in accordance with QP-4.2, Standard Operating Procedure Development, and are documented in accordance with QP-5.7, Notebook Documentation for Environmental Restoration Technical Activities.

Note: Because many types of PCB field-screening kits are available, the instructions provided by the manufacturer of the kit must be followed.

6.1 Pre-operation Activities

- 6.1.1 Obtain a copy of the manufacturer's instruction manual for using the kit. Submit it to the ER Project's Records Processing Facility (RPF) to obtain an ER ID number.
- 6.1.2 Be sure that you, and any other personnel using the screening kit, are properly trained in the conduct of the analysis.
- 6.1.3 Gather all necessary materials, as specified in the PCB field-screening kit's instruction manual.
- 6.1.4 Obtain sample collection logs and labels from the Sample Management Office (ER-SOP-1.04, Sample Control and Field Documentation). Samples collected for screening must be controlled according to ER-SOP-1.04.
- 6.1.5 Record any information pertaining to the type of kit, the lot, and the serial number in the Screening Data Sheet (Attachment A to this SOP), the Sample Collection Log, the Daily Activity Log, or the field notebook (ER-SOP-1.04, Sample Control and Field Documentation).

6.2 Screening Operation

- 6.2.1 Follow the manufacturer's instructions for conducting the screening analysis.
- 6.2.2 To determine the effectiveness of a PCB field-screening kit, initially a split of 10% of the samples must be submitted for fixed-base laboratory analysis using EPA-approved methods. This analysis determines if the specific PCB field-screening kit that was chosen is appropriate for the site-specific conditions. It also helps determine if

the matrix being analyzed, or other contaminants that are present, could cause interference and detection problems with the particular kit being used. Once an acceptable correlation has been made between the concentrations found at the site (as measured by approved methods) and those being measured by the kit, the percent of samples submitted for fixed-base laboratory analysis can be reduced or even eliminated. If possible, the process of reducing the number of splits that undergo fixed-base analysis should be described in such planning documents as a field implementation plan or voluntary corrective action plan. This is because reduction decisions are based on how a kit is being used. If a kit is being used to help guide a cleanup effort, for example, and if that kit has a demonstrated good performance record; additional fixed-base laboratory splits may be eliminated with the justification that all cleanup verification samples are going to be submitted for fixed-base laboratory analysis. The decision must be documented according to either ER-SOP-1.04, Sample Control and Field Documentation, or QP-5.7, Notebook Documentation for Environmental Restoration Technical Activities.

- 6.2.3 With every set (typically 10) of samples analyzed, a duplicate sample should be analyzed using the PCB field-screening kit.
- 6.2.4 Complete a Screening Data Sheet (Attachment A) by recording the date, sample ID, and the results of the screening analysis.

6.3 Post-operation Activities

- 6.3.1 Decontaminate equipment, if needed (ER-SOP-1.08, Field Decontamination of Drilling and Sampling Equipment).
- 6.3.2 Kits should be properly disposed of, along with all other generated waste (ER-SOP-1.06, Management of ER Project Wastes).

7.0 REFERENCES

The following documents have been cited within this procedure.

ER-SOP-1.04, Sample Control and Field Documentation

ER-SOP-1.06, Management of ER Project Wastes

ER-SOP-1.08, Field Decontamination of Drilling and Sampling Equipment

LPR (Laboratory Performance Requirement) 308-00-00.1, Quality (a Los Alamos National Laboratory document, available from

<http://labreq.lanl.gov/hdir/labreq.html>)

EPA (Environmental Protection Agency) Integrated Risk Information System (IRIS), <http://www.epa.gov/iris/subst/0294.htm> (IRIS is a database of human health effects that may result from exposure to various substances found in the environment)

QP-2.2, Personnel Orientation and Training

QP-4.2, Standard Operating Procedure Development

QP-4.3, Records Management

QP-5.7, Notebook Documentation for Environmental Restoration Technical Activities

8.0 RECORDS

The **FTL** is responsible for submitting the following records (processed in accordance with QP-4.3) to the RPF.

8.1 Any Sample Collection Logs, if appropriate

8.2 Any Screening Data Sheets

8.3 Any Daily Activity Logs or field notebooks, if appropriate

8.4 Manufacturer's instruction manual for a specific PCB field-screening kit

9.0 ATTACHMENTS

Attachment A: Screening Data Sheet (1 page) located at <http://erinternal.lanl.gov/Quality/user/forms.asp>.

[Using a token card, click here to record "self-study" training to this procedure.](#)

If you do not possess a token card or encounter problems, contact the RRES-ECR training specialist.

Screening Data Sheet

Kit Type (Manufacturer's Name)_____ Manufacturer's Instructions ER ID # _____

Serial Number _____ Date _____

Sample ID	Results
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